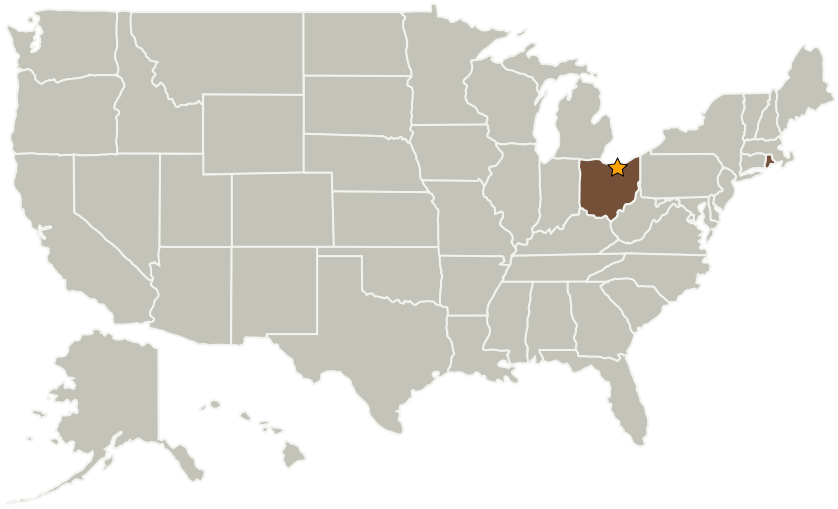
High Capacity Nano-Composite Cathodes for Human-Rated Lithium-Ion Batteries, Phase I

Completed Technology Project (2008 - 2008)

Project Introduction

Non-incremental improvements are necessary in lithium-ion batteries order to meet future space applications demands such as NASA's call for lithium-ion battery cathodes with specific capacity values exceeding 240mAh/g at C/2 discharge rate and 25ºC. Novel concepts for lithium-ion battery chemistry and/or design are therefore desired. Yardney Technical Products, Inc. proposes a development of an advanced nano-composite cathode, based on two crucial components, each performing a different vital function: ☐ The first component, a layered non-transition oxide material will provide the matrix of the composite and ensure that the cathode voltage falls above ~4.0V. ☐ The metallic nano-particulate domains, dispersed uniformly within the layered oxide matrix will provide the composite cathode with a potentially high specific capacity. Metallic nanoparticles are expected to form an in-situ oxide phase upon cycling in a lithium ion battery. The composite electrode material may be coated with a thin layer of carbon in order to enhance the electronic conductivity of the as-synthesized composite electrode.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
Yardney Technical Products, Inc.	Supporting Organization	Industry	East Greenwich, Rhode Island

Primary U.S. Work Locations	
Ohio	Rhode Island

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Malgazorta Gulbinska

Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
  - TX03.2 Energy Storage
    - TX03.2.1 Electrochemical: Batteries